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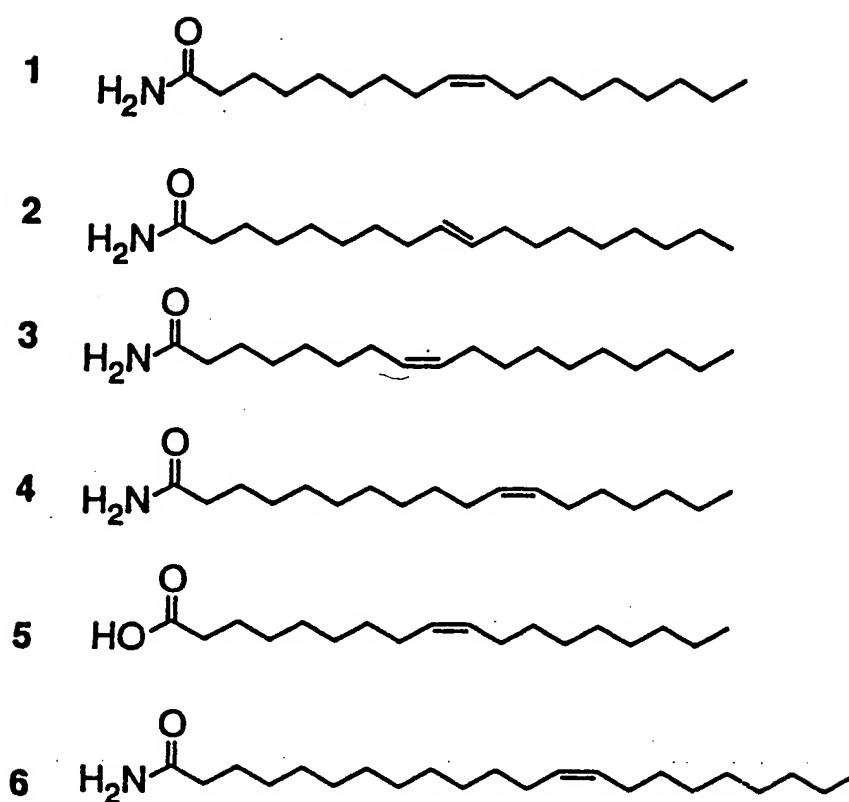


FIG. 1

SPGGSSGGEGALIGSGGSPLGLGTDIGGSIRFPSAFC
GICGLKPTGNRLSKSGLKGCYVGQTAVQLSLGPMARD
VESLALCLKALLCEHLFTLDPTVPPFPFREEVYRSSR
PLRVGYEYTDNYTMPSPAMRRALIETKQRLEAAGHTL
IPFLPNNIPYALEVLSAGGLFSDGGRSFLQNFKGDFV
DPCLGDLILILRLPSWFKRLLSLLLKPLFPRLAAFLN
SMRPRSAEKLWKLQHEIEMYRQSVIAQWKAMNLDVLL
TPMLGPALDLNTPGR

FIG. 2

Rat Liver



- 1) Sucrose gradient of liver membrane
- 2) 100 mM Na₂CO₃ wash
- 3) Solubilization in Triton-based buffer

Liver Plasma Membrane

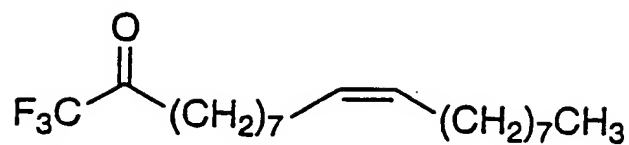


- 1) DEAE column (ion exchange)
- 2) Hg column
- 3) Heparin column (detergent xchg)
- 4) Affinity column with
trifluoroketone inhibitor

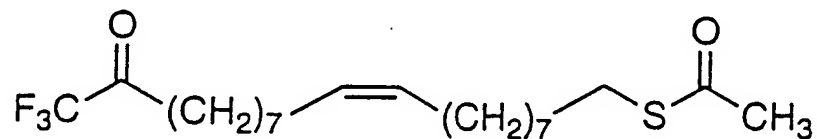
Amidase activity 20-30 fold enriched, 10-15% yield

Assay used: ¹⁴C radiolabeled substrate and TLC analysis

FIG. 3

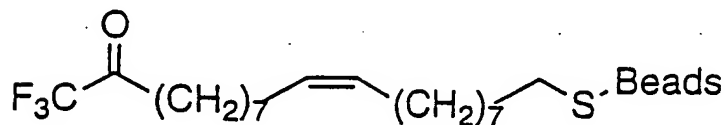


Trifluoroketone Inhibitor: $K_i = 1 \text{ nM}$



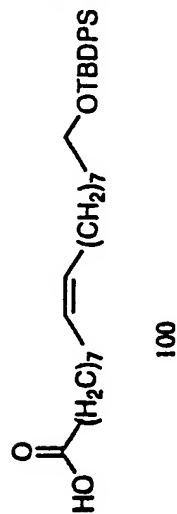
base deprotection
of thioacetate, and
immediate linkage

Link to disulfide-
derivatized solid support

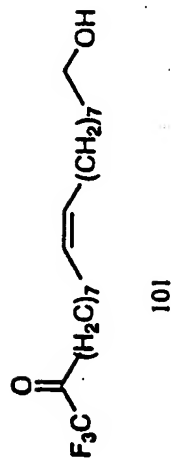
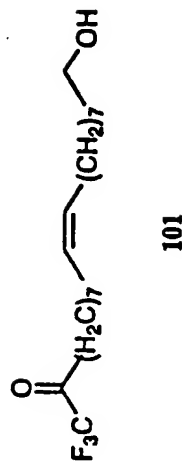


Advantage: thioacetate
equivalent inhibitory potential to
unmodified inhibitor, remove
protein with reducing agent (20
mM DTT, 4° o/n)

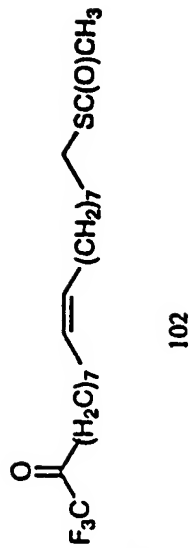
FIG. 4



- 1) Oxalyl chloride (4 eq), CH₂Cl₂, 4 hr, 0-25°
 2) (CF₃O)₂O (6 eq), Pyridine (8 eq), Et₃O, 3 h, 0-25°
 3) TBAF (3 eq), THF, 3 h, 25°
 66% yield

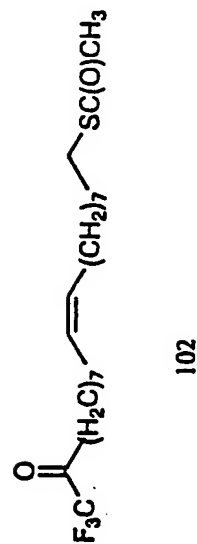


- 1) Ph₃P (2 eq), DEAD (2 eq), THF, 0°, 30 min



- 2) Thiolacetic acid (2 eq), 101 i(1 eq) in THF, 0°, 30 min

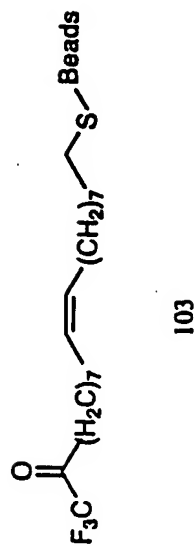
71% yield



- 1) NaOH (3 eq), CH₃OH, 0°, 10 min

- 2) 1N cold aq HCl to pH 7, 0°

- 3) Pyridyl disulfide beads (Sigma)
1mM, NaHCO₃, 2 h, 25 °C.



95% yield

FIG. 5

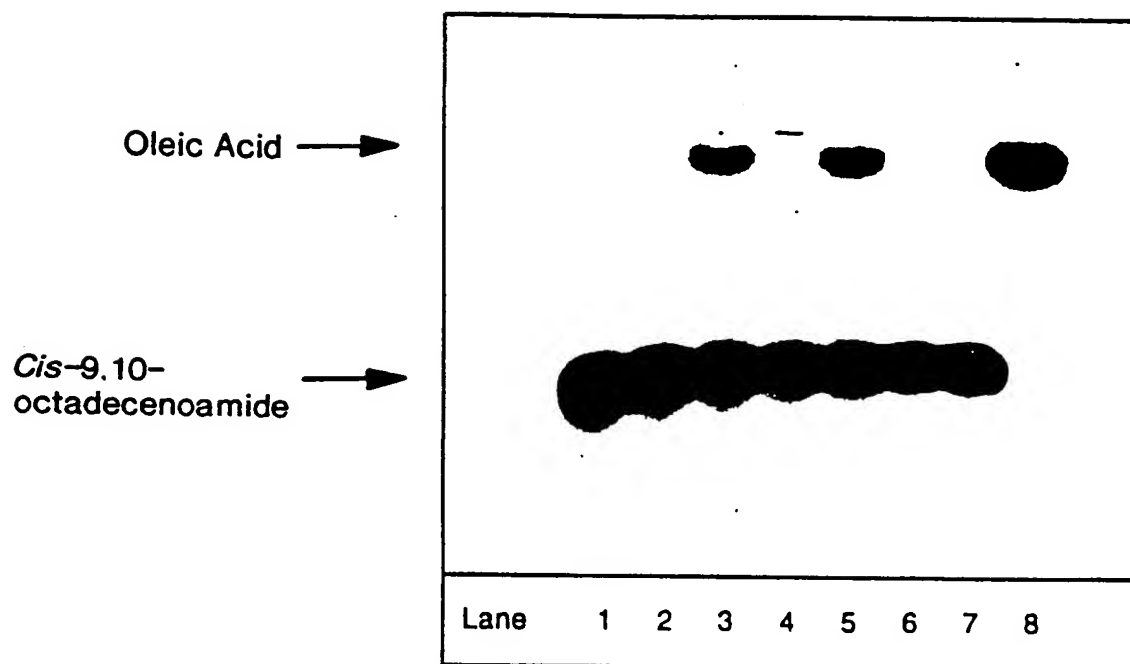


FIG. 6

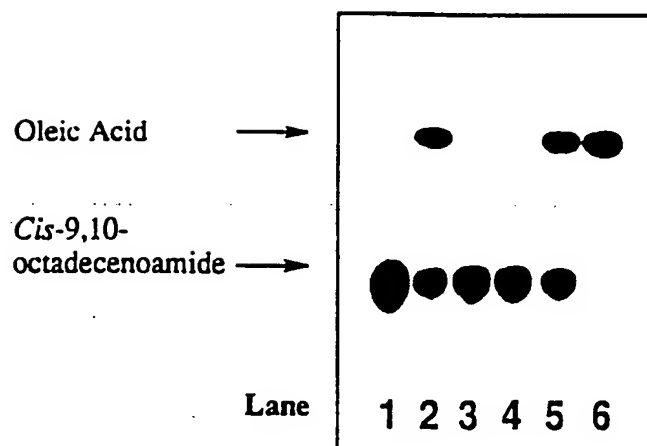
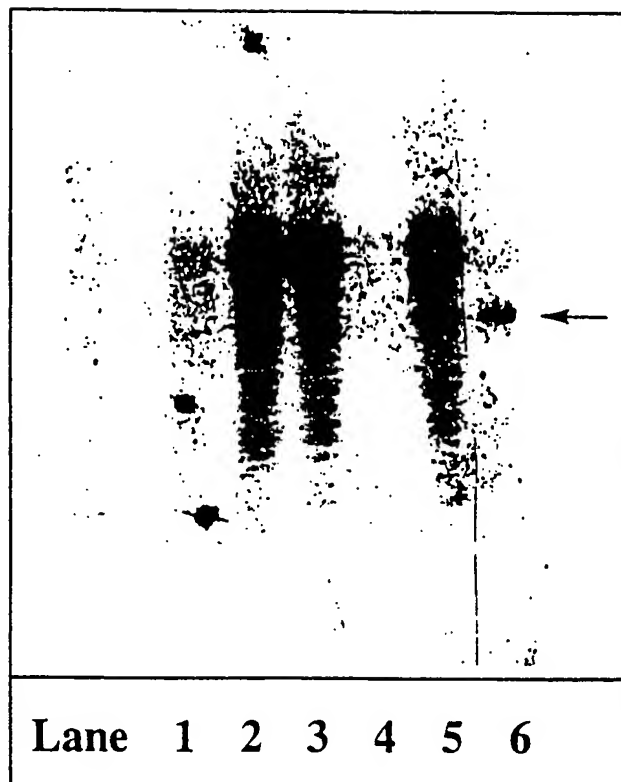


FIG. 7

28S ribosome (~5kb)



18S ribosome (~2kb)



Lane 1 2 3 4 5 6

FIG. 8

1-MVLSEVWTTLSGVSGVCLACSLLSAAVVL RWTGRQKARGAATRARQKQRA
51-SLETMDKAVQRFRLQNPDLDSEALLTLPLLQLVQKLQSGELSPEAVFFTY
101-LGKAWEVNKGTNCVTSYLTDCETQLSQAPRQGLLYGVPVSLKECF SYKGH
151-DSTLGLSLNEGMPSESDCVVQVLKLGAVPFVHTNVPQSMLSFD CSNPL
201-FGQTMNPWKSSKSPGGSSGGEGALIGSGGSPLGLGTDIGGSIRFP SAFCG
251-ICGLKPTGNRLSKSGLKGC VYGQTAVQLSLGPMARDVESLALCLKALLCE
301-HLFTLDPTVPPLPFFREEVYRSSRPLRVGY~~Y~~ETDNYTMPSPAMRRALIE TK
351-QRLEAAGHTLIPFLPNNIPYALEVLSAGGLFSDGGRSFLQNEKGDFVDPC
401-LGDLILILRLPSWFKRLLSLLLKPLFPRLAAFLNSMRPRSAEKLWKLQHE
451-IEMYRQSVIAQWKAMNLDVLLTPMLGPALDLNTPGRATGAISYTVLYNCL
501-DFPAGVVPVTTVTAEDDAQMELYKGYFGDIWDIILKKAMKNSVGLPVAVQ
551-CVALPWQEELCLRFMREVEQLMTPQKQPS-579

FIG. 9

	10		20		30		40								
	*		*		*		*								
GGT	TTG	TGC	GAG	CCG	AGT	TCT	CTC	GGG	TGG	CGG	TCG	GCT	GCA	GGA	GAT
50		60		70		80		90							
*		*		*		*		*							
CAT	GGT	GCT	GAG	CGA	AGT	GTG	GAC	CAC	GCT	GTC	TGG	GGT	CTC	CGG	GGT
M	V	L	S	E	V	W	T	T	L	S	G	V	S	G	V>
100		110		120		130		140							
*		*		*		*		*							
TTG	CCT	AGC	CTG	CAG	CTT	GTT	GTC	GGC	GGC	GGT	GGT	CCT	GCG	ATG	GAC
C	L	A	C	S	L	L	S	A	A	V	V	L	R	W	T>
150		160		170		180		190							
*		*		*		*		*							
CGG	GCG	CCA	GAA	GGC	CCG	GGG	CGC	GGC	GAC	CAG	GGC	GCG	GCA	GAA	GCA
G	R	Q	K	A	R	G	A	A	T	R	A	R	Q	K	Q>
200		210		220		230		240							
*		*		*		*		*							
GCG	AGC	CAG	CCT	GGA	GAC	CAT	GGA	CAA	GGC	GGT	GCA	GCG	CTT	CCG	GCT
R	A	S	L	E	T	M	D	K	A	V	Q	R	F	R	L>
250		260		270		280									
*		*		*		*		*							
GCA	GAA	TCC	TGA	CCT	GGA	CTC	GGA	GGC	CTT	GCT	GAC	CCT	GCC	CCT	ACT
Q	N	P	D	L	D	S	E	A	L	L	T	L	P	L	L>
290		300		310		320		330							
*		*		*		*		*							
CCA	ACT	GGT	ACA	GAA	GTT	ACA	GAG	TGG	AGA	GCT	GTC	CCC	AGA	GGC	TGT
Q	L	V	Q	K	L	Q	S	G	E	L	S	P	E	A	V>
340		350		360		370		380							
*		*		*		*		*							
GTT	CTT	TAC	TTA	CCT	GGG	AAA	GGC	CTG	GGA	AGT	GAA	CAA	AGG	GAC	CAA
F	F	T	Y	L	G	K	A	W	E	V	N	K	G	T	N>
390		400		410		420		430							
*		*		*		*		*							
CTG	CGT	GAC	CTC	CTA	TCT	GAC	CGA	CTG	TGA	GAC	TCA	GCT	GTC	CCA	GGC
C	V	T	S	Y	L	T	D	C	E	T	Q	L	S	Q	A>

FIG. 10-1

```

      440      450      460      470      480
      *      *      *      *      *
CCC ACG GCA GGG CCT GCT CTA TGG TGT CCC TGT GAG CCT CAA GGA ATG
  P   R   Q   G   L   L   Y   G   V   P   V   S   L   K   E   C>

      490      500      510      520
      *      *      *      *
CTT CAG CTA CAA GGG CCA CGA CTC CAC ACT GGG CTT GAG CCT GAA TGA
  F   S   Y   K   G   H   D   S   T   L   G   L   S   L   N   E>

530      540      550      560      570
*      *      *      *      *
GGG CAT GCC ATC GGA ATC TGA CTG TGT GGT GGT GCA AGT GTT GAA GCT
  G   M   P   S   E   S   D   C   V   V   V   Q   V   L   K   L>

      580      590      600      610      620
      *      *      *      *      *
GCA GGG AGC TGT GCC CTT TGT GCA TAC CAA TGT CCC CCA GTC CAT GTT
  Q   G   A   V   P   F   V   H   T   N   V   P   Q   S   M   L>

      630      640      650      660      670
      *      *      *      *      *
AAG CTT TGA CTG CAG TAA CCC TCT CTT TGG CCA GAC CAT GAA CCC ATG
  S   F   D   C   S   N   P   L   F   G   Q   T   M   N   P   W>

      680      690      700      710      720
      *      *      *      *      *
GAA GTC CTC CAA GAG CCC AGG AGG TTC CTC AGG GGG TGA GGG GGC TCT
  K   S   S   K   S   P   G   G   S   S   G   G   E   G   A   L>

      730      740      750      760
      *      *      *      *
CAT TGG ATC TGG AGG TTC CCC TCT GGG TTT AGG CAC TGA CAT TGG CGG
  I   G   S   G   G   S   P   L   G   L   G   T   D   I   G   G>

770      780      790      800      810
*      *      *      *      *
CAG CAT CCG GTT CCC TTC TGC CTT CTG CGG CAT CTG TGG CCT CAA GCC
  S   I   R   F   P   S   A   F   C   G   I   C   G   L   K   P>

      820      830      840      850      860
      *      *      *      *      *
TAC TGG CAA CCG CCT CAG CAA GAG TGG CCT GAA GGG CTG TGT CTA TGG
  T   G   N   R   L   S   K   S   G   L   K   G   C   V   Y   G>

      870      880      890      900      910
      *      *      *      *      *
ACA GAC GGC AGT GCA GCT TTC TCT TGG CCC CAT GGC CCG GGA TGT GGA
  Q   T   A   V   Q   L   S   L   G   P   M   A   R   D   V   E>

      920      930      940      950      960
      *      *      *      *      *
GAG CCT GGC GCT ATG CCT GAA AGC TCT ACT GTG TGA GCA CTT GTT CAC
  S   L   A   L   C   L   K   A   L   L   C   E   H   L   F   T>

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FIG. 10-2

	970		980		990		1000									
	*		*		*		*									
	CTT	GGA	CCC	TAC	CGT	GCC	TCC	CTT	GCC	CTT	CAG	AGA	GGA	GGT	CTA	TAG
	L	D	F	T	V	P	P	L	P	F	R	E	E	V	Y	R>
1010			1020				1030				1040				1050	
*			*				*				*				*	
	AAG	TTC	TAG	ACC	CCT	GCG	TGT	GGG	GTA	CTA	TGA	GAC	TGA	CAA	CTA	TAC
	S	S	R	P	L	R	V	G	Y	Y	E	T	D	N	Y	T>
	1060		1070				1080				1090				1100	
	*		*				*				*				*	
	CAT	GCC	CAG	CCC	AGC	TAT	GAG	GAG	GGC	TCT	GAT	AGA	GAC	CAA	GCA	GAG
	M	P	S	P	A	M	R	R	A	L	I	E	T	K	Q	R>
	1110		1120				1130				1140				1150	
	*		*				*				*				*	
	ACT	TGA	GGC	TGC	TGG	CCA	CAC	GCT	GAT	TCC	CTT	CTT	ACC	CAA	CAA	CAT
	L	E	A	A	G	H	T	L	I	P	F	L	P	N	N	I>
	1160		1170				1180				1190				1200	
	*		*				*				*				*	
	ACC	CTA	CGC	CCT	GGA	GGT	CCT	GTC	TGC	GGG	CGG	CCT	GTT	CAG	TGA	CGG
	P	Y	A	L	E	V	L	S	A	G	G	L	F	S	D	G>
	1210		1220				1230				1240					
	*		*				*				*					
	TGG	CCG	CAG	TTT	TCT	CCA	AAA	CTT	CAA	AGG	TGA	CTT	TGT	GGA	TCC	CTG
	G	R	S	F	L	Q	N	F	K	G	D	F	V	D	P	C>
1250			1260				1270				1280				1290	
*			*				*				*				*	
	CTT	GGG	AGA	CCT	GAT	CTT	AAT	TCT	GAG	GCT	GCC	CAG	CTG	GTT	TAA	AAG
	L	G	D	L	I	L	I	L	R	L	P	S	W	F	K	R>
	1300		1310				1320				1330				1340	
	*		*				*				*				*	
	ACT	GCT	GAG	CCT	CCT	GCT	GAA	GCC	TCT	GTT	TCC	TCG	GCT	GGC	AGC	CTT
	L	L	S	L	L	L	K	P	L	F	P	R	L	A	A	F>
	1350		1360				1370				1380				1390	
	*		*				*				*				*	
	TCT	CAA	CAG	TAT	GCG	TCC	TCG	GTC	AGC	TGA	AAA	GCT	GTG	GAA	ACT	GCA
	L	N	S	M	R	P	R	S	A	E	K	L	W	K	L	Q>
	1400		1410				1420				1430				1440	
	*		*				*				*				*	
	GCA	TGA	GAT	TGA	GAT	GTA	TCG	CCA	GTC	TGT	GAT	TGC	CCA	GTG	GAA	AGC
	H	E	I	E	M	Y	R	Q	S	V	I	A	Q	W	K	A>
	1450		1460				1470				1480					
	*		*				*				*					
	GAT	GAA	CTT	GGA	TGT	GCT	GCT	GAC	CCC	CAT	GTT	GGG	CCC	TGC	TCT	GGA
	M	N	L	D	V	L	L	T	P	M	L	G	P	A	L	D>

FIG. 10-3

1490 1500 1510 1520 1530
 * * * * *
 TTT GAA CAC ACC GGG CAG AGC CAC AGG GGC TAT CAG CTA CAC CGT TCT
 L N T P G R A T G A I S Y T V L>
 1540 1550 1560 1570 1580
 * * * * *
 CTA CAA CTG CCT GGA CTT CCC TGC GGG GGT GGT GCC TGT CAC CAC TGT
 Y N C L D F P A G V V P V T T V>
 1590 1600 1610 1620 1630
 * * * * *
 GAC CGC CGA GGA CGA TGC CCA GAT GGA ACT CTA CAA AGG CTA CTT TGG
 T A E D D A Q M E L Y K G Y F G>
 1640 1650 1660 1670 1680
 * * * * *
 GGA TAT CTG GGA CAT CAT CCT GAA GAA GGC CAT GAA AAA TAG TGT CGG
 D I W D I I L K K A M K N S V G>
 1690 1700 1710 1720
 * * * *
 TCT GCC TGT GGC TGT GCA GTG CGT GGC TCT GCC CTG GCA GGA AGA GCT
 L P V A V Q C V A L P W Q E E L>
 1730 1740 1750 1760 1770
 * * * * *
 GTG TCT GAG GTT CAT GCG GGA GGT GGA ACA GCT GAT GAC CCC TCA AAA
 C L R F M R E V E Q L M T P Q K>
 1780 1790 1800 1810 1820
 * * * * *
 GCA GCC ATC GTG AGG GTC GTT CAT CCG CCA GCT CTG GAG GAC CTA AGG
 Q P S *>
 1830 1840 1850 1860 1870
 * * * * *
 CCC ATG CGC TGT GCA CTG TAG CCC CAT GTA TTC AGG AGC CAC CAC CCA
 1880 1890 1900 1910 1920
 * * * * *
 CGA GGG AAC GCC CAG CAC AGG GAA GAG GTG TCT ACC TGC CCT CCC CTG
 1930 1940 1950 1960
 * * * *
 GAC TCC TGC AGC CAC AAC CAA GTC TGG ACC TTC CTC CCC GTT ATG GTC
 1970 1980 1990 2000 2010
 * * * * *
 TAC TTT CCA TCC TGA TTC CCT GCT TTT TAT GGC AGC CAG CAG GAA TGA
 2020 2030 2040 2050 2060
 * * * * *
 CGT GGG CCA AGG ATC ACC AAC ATT CAA AAA CAA TGC GTT TAT CTA TTT

FIG. 10-4

2070	2080	2090	2100	2110
*	*	*	*	*
TCT GGG TAT CTC CAT TAG GGC CCT GGG AAC CAG AGT GCT GGG AAG GCT				
2120	2130	2140	2150	2160
*	*	*	*	*
GTC CAG ACC CTC CAG AGC TGG CTG TAA CCA CAT CAC TCT CCT GCT CCA				
2170	2180	2190	2200	
*	*	*	*	
AAG CCT CCC TAG TTC TGT CAC CCA CAA GAT AGA CAC AGG GAC ATG TCC				
2210	2220	2230	2240	2250
*	*	*	*	*
TTG GCA CTT GAC TCC TGT CCT TCC TTT CTT ATT CAG ATT GAC CCC AGC				
2260	2270	2280	2290	2300
*	*	*	*	*
CTT GAT GGA CCC TGC CCC TGC ACT TCC TTC CTC AGT CCA CCT CTC TGC				
2310	2320	2330	2340	2350
*	*	*	*	*
CGA CAC GCC CTT TTT ATG GCT CCT CTA TTT GTT GTG GAG ACA AGG TTT				
2360	2370	2380	2390	2400
*	*	*	*	*
CTC TCA GTA GCC CTG GCT GTC CAG GAC CTC ACT CTG TAG ATG AGG CTG				
2410	2420	2430	2440	
*	*	*	*	
GCT TTC AAC TCA CAA GGC TGC CTG CCT GGG TGC TGG GAT TAA AGG CGT				
2450	2460	2470		
*	*	*		
ATG CCA CCA CAA AGA AAA AAA AAA				

FIG. 10-5

Oleamide Hydrolase (Rat)	215-GGSSGGE G ALIGSGGSP L GLGTDIGGSIRFPS-246
Propionamidase (Chick)	222-GGSSGGE G AL I AGGSL L GI G SDVAGSIRLPS-253
Putative Amidase (<i>C. elegans</i>)	212-GGSSGGE G ALIGAGGSLIGICTDVGGSVRIPC-243
Putative Amidase (<i>C. elegans</i>)	213-GGSSGGE F SALISADGSL L GI G GDVGG S IRIPC-244
Putative Amidase (<i>S. cerevisiae</i>)	207-GGSSGGE G SLIGA H GSL L GLGTDIGGSIRIPS-238
Acetamidase (<i>Aspergillus</i>)	202-GGSSGGE G AI V GIRGGVIGVGTDIGGSIDVPA-233
Indoleacetamidase (<i>Agrobacterium</i>)	147-GGSSGGVAAAVASRLMLGGICTDTGASVRLPA-178
Indoleacetamidase (<i>Pseudomonas</i>)	144-GGSSGGVAAAVASGIVPLSVGTDTGGSIRIPPA-175

FIG. 11

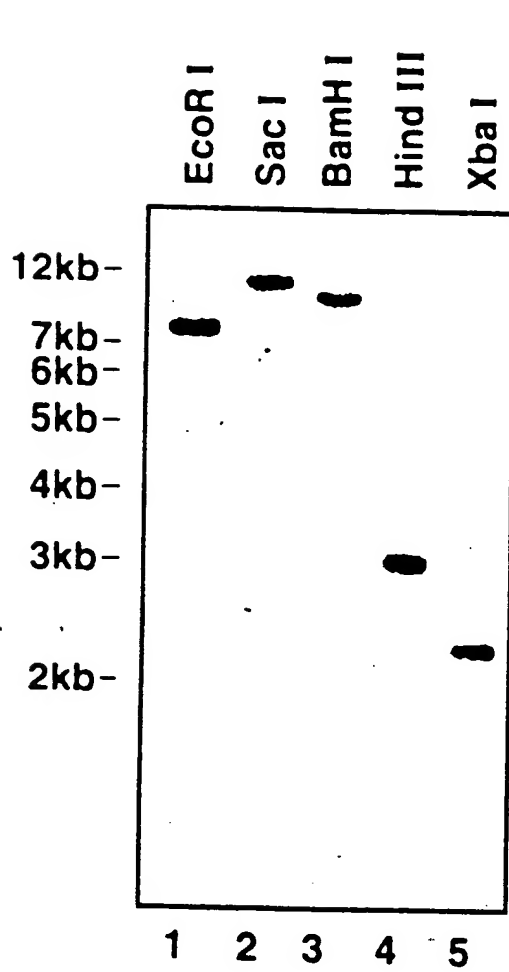


FIG. 12A

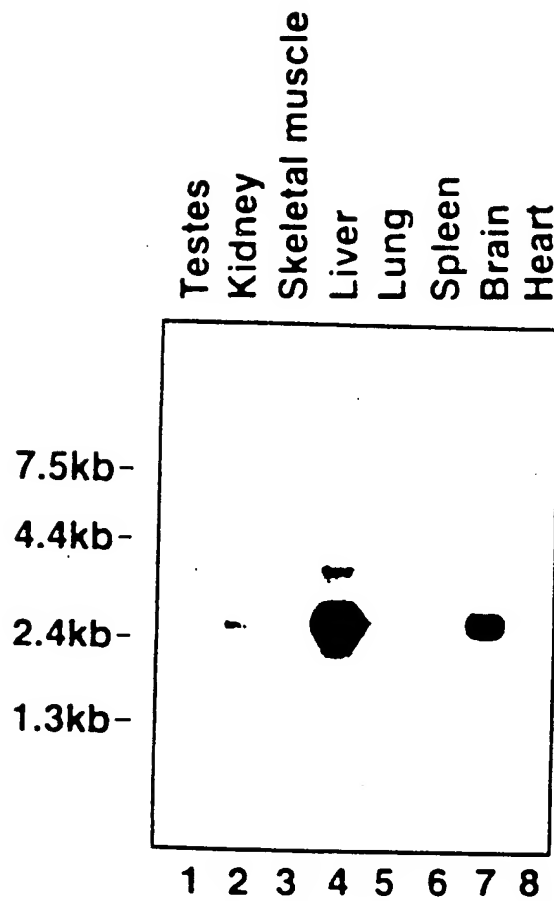


FIG. 12B

										10					20					30					40				
										*					*					*					*				
TGG	GTC	ATG	GTG	CTG	AGC	GAA	GTG	TGG	ACC	GCG	CTG	TCT	GGA	CTC	TCC														
ACC	CAG	TAC	CAC	GAC	TCG	CTT	CAC	ACC	TGG	CGC	GAC	AGA	CCT	GAG	AGG														
W	V	M	V	L	S	E	V	W	T	A	L	S	G	L	S>														
50										60					70					80					90				
*										*					*					*					*				
GGG	GTT	TGC	CTA	GCC	TGC	AGC	TTG	CTG	TCG	GCG	GTG	GTC	CTG	CGA															
CCC	CAA	ACG	GAT	CGG	ACG	TCG	AAC	GAC	AGC	CGC	CGC	CAC	CAG	GCT															
G	V	C	L	A	C	S	L	L	S	A	A	V	V	L	R>														
100										110					120					130					140				
*										*					*					*					*				
TGG	ACC	AGG	AGC	CAG	ACC	GCC	CGG	GGC	GCG	GTG	ACC	AGG	GCG	CGG	CAG														
ACC	TGG	TCC	TCG	GTC	TGG	CGG	GCC	CCG	CGC	CAC	TGG	TCC	CGC	GCC	GTC														
W	T	R	S	Q	T	A	R	G	A	V	T	R	A	R	Q>														
150										160					170					180					190				
*										*					*					*					*				
AAG	CAG	CGA	GCC	GGC	CTG	GAG	ACC	ATG	GAC	AAG	GCG	GTG	CAG	CGC	TTC														
TTC	GTC	GCT	CGG	CCG	GAC	CTC	TGG	TAC	CTG	TTC	CGC	CAC	GTC	CGC	AAG														
K	Q	R	A	G	L	E	T	M	D	K	A	V	Q	R	F>														
200										210					220					230					240				
*										*					*					*					*				
CGG	CTG	CAG	AAT	CCT	GAC	CTG	GAT	TCA	GAG	GCC	TTG	CTG	GCT	CTG	CCC														
GCC	GAC	GTC	TTA	GGA	CTG	GAC	CTA	AGT	CTC	CGG	AAC	GAC	CGA	GAC	GGG														
R	L	Q	N	P	D	L	D	S	E	A	L	L	A	L	P>														
250										260					270					280									
*										*					*					*									
CTG	CTC	CAA	CTG	GTA	CAG	AAG	TTA	CAG	AGT	GGG	GAA	CTG	TCC	CCA	GAA														
GAC	GAG	GTT	GAC	CAT	GTC	TTC	AAT	GTC	TCA	CCC	CTT	GAC	AGG	GGT	CTT														
L	L	Q	L	V	Q	K	L	Q	S	G	E	L	S	P	E>														
290										300					310					320					330				
*										*					*					*					*				
GCT	GTG	CTC	TTT	ACC	TAC	CTG	GGA	AAG	GCC	TGG	GAA	GTG	AAC	AAA	GGG														
CGA	CAC	GAG	AAA	TGG	ATG	GAC	CCT	TTC	CGG	ACC	CTT	CAC	TTG	TTT	CCC														
A	V	L	F	T	Y	L	G	K	A	W	E	V	N	K	G>														
340										350					360					370					380				
*										*					*					*					*				
ACC	AAC	TGT	GTG	ACC	TCC	TAT	CTG	ACT	GAC	TGT	GAG	ACT	CAG	CTG	TCC														
TGG	TTG	ACA	CAC	TGG	AGG	ATA	GAC	TGA	CTG	ACA	CTC	TGA	GTC	GAC	AGG														
T	N	C	V	T	S	Y	L	T	D	C	E	T	Q	L	S>														
390										400					410					420					430				
*										*					*					*					*				
CAG	GCC	CCA	CGG	CAG	GGC	CTG	CTC	TAT	GGC	GTC	CCC	GTG	AGC	CTC	AAG														
GTC	CGG	GGT	GCC	GTC	CCG	GAC	GAG	ATA	CCG	CAG	GGG	CAC	TCG	GAG	TTC														
Q	A	P	R	Q	G	L	L	Y	G	V	P	V	S	L	K>														
440										450					460					470					480				
*										*					*					*					*				
GAA	TGC	TTC	AGC	TAC	AAG	GGC	CAT	GCT	TCC	ACA	CTG	GGC	TTA	AGT	TTG														
CTT	ACG	AAG	TCG	ATG	TTC	CCG	GTA	CGA	AGG	TGT	GAC	CCG	AAT	TCA	AAC														
E	C	F	S	Y	K	G	H	A	S	T	L	G	L	S	L>														

FIG. 13-1

490					500					510					520									
*					*					*					*									
AAC	GAG	GGT	GTG	ACA	TCG	GAG	AGT	GAC	TGT	GTG	GTG	GTG	GTG	CAG	GTA	CTG								
TTG	CTC	CCA	CAC	TGT	AGC	CTC	TCA	CTG	ACA	CAC	CAC	CAC	CAC	GTC	CAT	GAC								
N	E	G	V	T	S	E	S	D	C	V	V	V	V	Q	V	L>								
530					540					550					560					570				
*					*					*					*					*				
AAG	CTG	CAG	GGA	GCT	GTG	CCC	TTT	GTG	CAC	ACC	AAC	GTC	CCC	CAG	TCC									
TTC	GAC	GTC	CCT	CGA	CAC	GGG	AAA	CAC	GTG	TGG	TTG	CAG	GGG	GTC	AGG									
K	L	Q	G	A	V	P	F	V	H	T	N	V	P	Q	S>									
580					590					600					610					620				
*					*					*					*					*				
ATG	CTA	AGC	TAT	GAC	TGC	AGT	AAC	CCC	CTC	TTT	GGC	CAG	ACC	ATG	AAC									
TAC	GAT	TCG	ATA	CTG	ACG	TCA	TTG	GGG	GAG	AAA	CCG	GTC	TGG	TAC	TTG									
M	L	S	Y	D	C	S	N	P	L	F	G	Q	T	M	N>									
630					640					650					660					670				
*					*					*					*					*				
CCG	TGG	AAG	CCC	TCC	AAG	AGT	CCA	GGA	GGT	TCC	TCA	GGG	GGT	GAG	GGG									
GGC	ACC	TTC	GGG	AGG	TTC	TCA	GGT	CCT	CCA	AGG	AGT	CCC	CCA	CTC	CCC									
P	W	K	P	S	K	S	P	G	G	S	S	G	G	E	G>									
680					690					700					710					720				
*					*					*					*					*				
GCT	CTC	ATT	GGA	TCT	GGA	GGC	TCC	CCT	CTG	GGT	TTA	GGC	ACT	GAC	ATC									
CGA	GAG	TAA	CCT	AGA	CCT	CCG	AGG	GGA	GAC	CCA	AAT	CCG	TGA	CTG	TAG									
A	L	I	G	S	G	G	S	P	L	G	L	G	T	D	I>									
730					740					750					760									
*					*					*					*									
GGC	GGC	AGC	ATC	CGG	TTC	CCT	TCT	GCC	TTC	TGT	GGC	ATC	TGT	GGC	CTC									
CCG	CCG	TCG	TAG	GCC	AAG	GGA	AGA	CGG	AAG	ACA	CCG	TAG	ACA	CCG	GAG									
G	G	S	I	R	F	P	S	A	F	C	G	I	C	G	L>									
770					780					790					800					810				
*					*					*					*					*				
AAG	CCT	ACT	GGG	AAC	CGC	CTC	AGC	AAG	AGT	GGC	CTG	AAG	AGC	TGT	GTT									
TTC	GGA	TGA	CCC	TTG	GCG	GAG	TCG	TTC	TCA	CCG	GAC	TTC	TCG	ACA	CAA									
K	P	T	G	N	R	L	S	K	S	G	L	K	S	C	V>									
820					830					840					850					860				
*					*					*					*					*				
TAT	GGA	CAG	ACA	GCA	GTG	CAG	CTT	TCT	GTT	GGC	CCC	ATG	GCA	CGG	GAT									
ATA	CCT	GTC	TGT	CGT	CAC	GTC	GAA	AGA	CAA	CCG	GGG	TAC	CGT	GCC	CTA									
Y	G	Q	T	A	V	Q	L	S	V	G	P	M	A	R	D>									
870					880					890					900					910				
*					*					*					*					*				
GTG	GAT	AGC	CTG	GCA	TTG	TGC	ATG	AAA	GCC	CTA	CTT	TGT	GAG	GAT	TTG									
CAC	CTA	TCG	GAC	CGT	AAC	ACG	TAC	TTT	CGG	GAT	GAA	ACA	CTC	CTA	AAC									
V	D	S	L	A	L	C	M	K	A	L	L	C	E	D	L>									
920					930					940					950					960				
*					*					*					*					*				
TTC	CGC	TTG	GAC	TCC	ACC	ATC	CCC	CCC	TTG	CCC	TTC	AGG	GAG	GAG	ATC									
AAG	GCG	AAC	CTG	AGG	TGG	TAG	GGG	GGG	AAC	GGG	AAG	TCC	CTC	CTC	TAG									
F	R	L	D	S	T	I	P	P	L	P	F	R	E	E	I>									
970					980					990					1000									
*					*					*					*									

FIG. 13-2

TAC AGA AGT TCT CGA CCC CTT CGT GTG GGA TAC TAT GAA ACT GAC AAC
 ATG TCT TCA AGA GCT GGG GAA GCA CAC CCT ATG ATA CTT TGA CTG TTG
 Y R S S R P L R V G Y Y E T D N>

1010 1020 1030 1040 1050
 * * * * *
 TAC ACC ATG CCC ACT CCA GCC ATG AGG AGG GCT GTG ATG GAG ACC AAG
 ATG TGG TAC GGG TGA GGT CGG TAC TCC TCC CGA CAC TAC CTC TGG TTC
 Y T M P T P A M R R A V M E T K>

1060 1070 1080 1090 1100
 * * * * *
 CAG AGT CTC GAG GCT GCT GGC CAC ACG CTG GTC CCC TTC TTA CCA AAC
 GTC TCA GAG CTC CGA CGA CCG GTG TGC GAC CAG GGG AAG AAT GGT TTG
 Q S L E A A G H T L V P F L P N>

1110 1120 1130 1140 1150
 * * * * *
 AAC ATA CCT TAT GCC CTG GAG GTC CTG TCG GCA GGT GGG CTG TTC AGT
 TTG TAT GGA ATA CGG GAC CTC CAG GAC AGC CGT CCA CCC GAC AAG TCA
 N I P Y A L E V L S A G G L F S>

1160 1170 1180 1190 1200
 * * * * *
 GAT GGT GGC TGC TCT TTT CTC CAA AAC TTC AAA GGC GAC TTT GTG GAT
 CTA CCA CCG ACG AGA AAA GAG GTT TTG AAG TTT CCG CTG AAA CAC CTA
 D G G C S F L Q N F K G D F V D>

1210 1220 1230 1240
 * * * *
 CCC TGC TTG GGG GAC CTG GTC TTA GTG CTG AAG CTG CCC AGG TGG TTT
 GGG ACG AAC CCC CTG GAC CAG AAT CAC GAC TTC GAC GGG TCC ACC AAA
 P C L G D L V L V L K L P R W F>

1250 1260 1270 1280 1290
 * * * * *
 AAA AAA CTG CTG AGC TTC CTG CTG AAG CCT CTG TTT CCT CGG CTG GCA
 TTT TTT GAC GAC TCG AAG GAC GAC TTC GGA GAC AAA GGA GCC GAC CGT
 K K L L S F L L K P L F P R L A>

1300 1310 1320 1330 1340
 * * * * *
 GCC TTT CTC AAC AGT ATG TGT CCT CGG TCA GCC GAA AAG CTG TGG GAA
 CGG AAA GAG TTG TCA TAC ACA GGA GCC AGT CGG CTT TTC GAC ACC CTT
 A F L N S M C P R S A E K L W E>

1350 1360 1370 1380 1390
 * * * * *
 CTG CAG CAT GAG ATT GAG ATG TAT CGC CAG TCC GTC ATT GCC CAG TGG
 GAC GTC GTA CTC TAA CTC TAC ATA GCG GTC AGG CAG TAA CGG GTC ACC
 L Q H E I E M Y R Q S V I A Q W>

1400 1410 1420 1430 1440
 * * * * *
 AAG GCA ATG AAC TTG GAC GTG GTG CTA ACC CCC ATG CTG GGT CCT GCT
 TTC CGT TAC TTG AAC CTG CAC CAC GAT TGG GGG TAC GAC CCA GGA CGA
 K A M N L D V V L T P M L G P A>

1450 1460 1470 1480
 * * * *
 CTG GAT TTG AAC ACA CCG GGC AGA GCC ACA GGG GCT ATC AGC TAC ACT
 GAC CTA AAC TTG TGT GGC CCG TCT CGG TGT CCC CGA TAG TCG ATG TGA

FIG. 13-3

L D L N T P G R A T G A I S Y T>

1490 1500 1510 1520 1530
 * * * * *
 GTT CTC TAT AAC TGC CTG GAC TTC CCT GCG GGG GTG GTG CCT GTC ACC
 CAA GAG ATA TTG ACG GAC CTG AAG GGA CGC CCC CAC CAC GGA CAG TGG
 V L Y N C L D F P A G V V P V T>

1540 1550 1560 1570 1580
 * * * * *
 ACT GTG ACC GCT GAG GAC GAT GCC CAG ATG GAA CAC TAC AAA GGC TAC
 TGA CAC TGG CGA CTC CTG CTA CGG GTC TAC CTT GTG ATG TTT CCG ATG
 T V T A E D D A Q M E H Y K G Y>

1590 1600 1610 1620 1630
 * * * * *
 TTT GGG GAT ATG TGG GAC AAC ATT CTG AAG AAG GGC ATG AAA AAG GGT
 AAA CCC CTA TAC ACC CTG TTG TAA GAC TTC TTC CCG TAC TTT TTC CCA
 F G D M W D N I L K K G M K K G>

1640 1650 1660 1670 1680
 * * * * *
 ATA GGC CTG CCT GTG GCT GTG CAG TGC GTG GCT CTG CCC TGG CAG GAA
 TAT CCG GAC GGA CAC CGA CAC GTC ACG CAC CGA GAC GGG ACC GTC CTT
 I G L P V A V Q C V A L P W Q E>

1690 1700 1710 1720
 * * * *
 GAG CTG TGT CTG CGG TTC ATG CGG GAG GTG GAA CGG CTG ATG ACC CCT
 CTC GAC ACA GAC GCC AAG TAC GCC CTC CAC CTT GCC GAC TAC TGG GGA
 E L C L R F M R E V E R L M T P>

1730 1740 1750 1760 1770
 * * * * *
 GAA AAG CGG CCA TCT TGA GGG TCA TTC ATC TGC CCA GCT CTG GAG GAC
 CTT TTC GCC GGT AGA ACT CCC AGT AAG TAG ACG GGT CGA GAC CTC CTG
 E K R P S *

1780 1790 1800 1810 1820
 * * * * *
 CTA AGG CCC ATG CGC TCT GCA CTG CAG CCC CAT CTA TTC AGG ATC CTG
 GAT TCC GGG TAC GCG AGA CGT GAC GTC GGG GTA GAT AAG TCC TAG GAC

1830 1840 1850 1860 1870
 * * * * *
 CCA CCC ATG AGG AGA TGC CCA GCA CGG GAA GAG GCA ACC ACC TGC CCT
 GGT GGG TAC TCC TCT ACG GGT CGT GCC CTT CTC CGT TGG TGG ACG GGA

1880 1890 1900 1910 1920
 * * * * *
 CCC CTG GAC TCC TAC AGA AAC CCA GGA CAT GCC CTC CAT AAC CAA GTC
 GGG GAC CTG AGG ATG TCT TTG GGT CCT GTA CGG GAG GTA TTG GTT CAG

1930 1940 1950
 * * *
 TGG ACC AGC TCC CCC GGA ATT CCT GCA GCC CGG GGG ATC
 ACC TGG TCG AGG GGG CCT TAA GGA CGT CGG GCC CCC TAG

FIG. 13-4

	10	20	30	40	50
	*	*	*	*	*
TG	CCG	GGC	GGT	AGG	CAG
AC	GGC	CCG	CCA	TCC	GTC
	P	G	G	R	Q
					Q
					Q
					A
					E
					G
					I
					M
					V
					Q
					Y
					E>
	60	70	80	90	
	*	*	*	*	
CTG	TGG	GCC	GCG	CTG	CCT
GAC	ACC	CGG	CGC	GAC	GGA
L	W	A	A	L	P
					G
					A
					S
					G
					V
					A
					L
					A
					C
					C>
100	110	120	130	140	
*	*	*	*	*	
TTC	GTG	GCG	GCG	GCC	GTG
AAG	CAC	CGC	CGC	CGG	CAC
F	V	A	A	A	V
					A
					L
					R
					W
					S
					G
					R
					R
					T
					A>
150	160	170	180	190	
*	*	*	*	*	
CGG	GGC	GCG	GTG	GTC	CGG
GCC	CCG	CGC	CAC	CAG	GCC
R	G	A	V	V	R
					A
					R
					Q
					K
					Q
					R
					A
					G
					L
					E>
200	210	220	230	240	
*	*	*	*	*	
AAC	ATG	GAC	AGG	GCG	GCG
TTC	TAC	CTG	TCC	CGC	CGC
N	M	D	R	A	A
					Q
					R
					F
					R
					L
					Q
					N
					P
					D
					L>
250	260	270	280	290	
*	*	*	*	*	
GAC	TCA	GAG	GCG	CTG	CTA
CTG	AGT	CTC	CGC	GAC	GAT
D	S	E	A	L	L
					A
					L
					P
					L
					P
					Q
					L
					V
					Q
					K>
300	310	320	330		
*	*	*	*		
TTA	CAC	AGT	AGA	GAG	CTG
AAT	GTG	TCA	TCT	CTC	GAC
L	H	S	R	E	L
					A
					P
					E
					A
					V
					L
					F
					T
					Y
					V>
340	350	360	370	380	
*	*	*	*	*	
GGA	AAG	GCC	TGG	GAA	GTG
CCT	TTC	CGG	ACC	CTT	CAC
G	K	A	W	E	V
					N
					K
					G
					T
					N
					C
					V
					T
					S
					Y>
390	400	410	420	430	
*	*	*	*	*	
CTG	GCT	GAC	TGT	GAG	ACT
GAC	CGA	CTG	ACA	CTC	TGA
L	A	D	C	E	T
					Q
					L
					S
					Q
					A
					P
					R
					Q
					G
					L>
440	450	460	470	480	
*	*	*	*	*	
CTC	TAT	GGC	GTC	CCT	GTG
GAG	ATA	CCG	CAG	GGA	CAC
L	Y	G	V	P	V
					S
					L
					K
					E
					C
					F
					T
					Y
					K
					G>

FIG. 14-1

490	500	510	520	530
*	*	*	*	*
CAG GAC TCC ACG CTG GGC TTG AGC CTG AAT GAA GGG GTG CCG GCG GAG				
GTC CTG AGG TGC GAC CCG AAC TCG GAC TTA CTT CCC CAC GGC CGC CTC				
Q D S T L G L S L N E G V P A E>				
540	550	560	570	
*	*	*	*	
TGC GAC AGC GTA GTG GTG CAT GTG CTG AAG CTG CAG GGT GCC GTG CCC				
ACG CTG TCG CAT CAC CAC GTA CAC GAC TTC GAC GTC CCA CGG CAC GGG				
C D S V V V H V L K L Q G A V P>				
580	590	600	610	620
*	*	*	*	*
TTC GTG CAC ACC AAT GTT CCA CAG TCC ATG TTC AGC TAT GAC TGC AGT				
AAG CAC GTG TGG TTA CAA GGT GTC AGG TAC AAG TCG ATA CTG ACG TCA				
F V H T N V P Q S M F S Y D C S>				
630	640	650	660	670
*	*	*	*	*
AAC CCC CTC TTT GGC CAG ACC GTG AAC CCA TGG AAG TCC TCC AAA AGC				
TTG GGG GAG AAA CCG GTC TGG CAC TTG GGT ACC TTC AGG AGG TTT TCG				
N P L F G Q T V N P W K S S K S>				
680	690	700	710	720
*	*	*	*	*
CCA GGG GGC TCC TCA GGG GGT GAA GGG GCC CTC ATC GGG TCT GGA GGC				
GGT CCC CCG AGG AGT CCC CCA CTT CCC CGG GAG TAG CCC AGA CCT CCG				
P G G S S G G E G A L I G S G G>				
730	740	750	760	770
*	*	*	*	*
TCC CCC CTG GGC TTA GGC ACT GAT ATC GGA GGC AGC ATC CGC TTC CCC				
AGG GGG GAC CCG AAT CCG TGA CTA TAG CCT CCG TCG TAG GCG AAG GGG				
S P L G L G T D I G G S I R F P>				
780	790	800	810	
*	*	*	*	
TCC TCC TTC TGC GGC ATC TGC GGC CTC AAG CCC ACA GGG AAC CGC CTC				
AGG AGG AAG ACG CCG TAG ACG CCG GAG TTC GGG TGT CCC TTG GCG GAG				
S S F C G I C G L K P T G N R L>				
820	830	840	850	860
*	*	*	*	*
AGC AAG AGT GGC CTG AAG GGC TGT GTC TAT GGA CAG GAG GCA GTG CGT				
TCG TTC TCA CCG GAC TTC CCG ACA CAG ATA CCT GTC CTC CGT CAC GCA				
S K S G L K G C V Y G Q E A V R>				
870	880	890	900	910
*	*	*	*	*
CTC TCC GTG GGC CCC ATG GCC CGG GAC GTG GAG AGC CTG GCA CTG TGC				
GAG AGG CAC CCG GGG TAC CGG GCC CTG CAC CTC TCG GAC CGT GAC ACG				
L S V G P M A R D V E S L A L C>				
920	930	940	950	960
*	*	*	*	*
CTG CGA GCC CTG CTG TGC GAG GAC ATG TTC CGC TTG GAC CCC ACT GTG				
GAC GCT CGG GAC GAC ACG CTC CTG TAC AAG GCG AAC CTG GGG TGA CAC				
L R A L L C E D M F R L D P T V>				
970	980	990	1000	1010
*	*	*	*	*

FIG. 14-2

CCT	CCC	TTG	CCC	TTC	AGA	GAA	GAG	GTC	TAC	ACC	AGC	TCT	CAG	CCC	CTG
GGA	GGG	AAC	GGG	AAG	TCT	CTT	CTC	CAG	ATG	TGG	TCG	AGA	GTC	GGG	GAC
P	P	L	P	F	R	E	E	V	Y	T	S	S	Q	P	L>
1020				1030				1040				1050			
*				*				*				*			
CGT	GTG	GGG	TAC	TAT	GAG	ACT	GAC	AAC	TAT	ACC	ATG	CCC	TCC	CCG	GCC
GCA	CAC	CCC	ATG	ATA	CTC	TGA	CTG	TTG	ATA	TGG	TAC	GGG	AGG	GGC	CGG
R	V	G	Y	Y	E	T	D	N	Y	T	M	P	S	P	A>
1060		1070		1080		1090		1100							
*		*		*		*		*							
ATG	AGG	CGG	GCC	GTG	CTG	GAG	ACC	AAA	CAG	AGC	CTT	GAG	GCT	GCG	GGG
TAC	TCC	GCC	CGG	CAC	GAC	CTC	TGG	TTT	GTC	TCG	GAA	CTC	CGA	CGC	CCC
M	R	R	A	V	L	E	T	K	Q	S	L	E	A	A	G>
1110		1120		1130		1140		1150							
*		*		*		*		*							
CAC	ACG	CTG	GTT	CCC	TTC	TTG	CCA	AGC	AAC	ATA	CCC	CAT	GCT	CTG	GAG
GTG	TGC	GAC	CAA	GGG	AAG	AAC	GGT	TCG	TTG	TAT	GGG	GTA	CGA	GAC	CTC
H	T	L	V	P	F	L	P	S	N	I	P	H	A	L	E>
1160		1170		1180		1190		1200							
*		*		*		*		*							
ACC	CTG	TCA	ACA	GGT	GGG	CTC	TTC	AGT	GAT	GGT	GGC	CAC	ACC	TTC	CTA
TGG	GAC	AGT	TGT	CCA	CCC	GAG	AAG	TCA	CTA	CCA	CCG	GTG	TGG	AAG	GAT
T	L	S	T	G	G	L	F	S	D	G	G	H	T	F	L>
1210		1220		1230		1240		1250							
*		*		*		*		*							
CAG	AAC	TTC	AAA	GGT	GAT	TTC	GTG	GAC	CCC	TGC	CTG	GGG	GAC	CTG	GTC
GTC	TTG	AAG	TTT	CCA	CTA	AAG	CAC	CTG	GGG	ACG	GAC	CCC	CTG	GAC	CAG
Q	N	F	K	G	D	F	V	D	P	C	L	G	D	L	V>
1260		1270		1280		1290									
*		*		*		*									
TCA	ATT	CTG	AAG	CTT	CCC	CAA	TGG	CTT	AAA	GGA	CTG	CTG	GCC	TTC	CTG
AGT	TAA	GAC	TTC	GAA	GGG	GTT	ACC	GAA	TTT	CCT	GAC	GAC	CGG	AAG	GAC
S	I	L	K	L	P	Q	W	L	K	G	L	L	A	F	L>
1300		1310		1320		1330		1340							
*		*		*		*		*							
GTG	AAG	CCT	CTG	CTG	CCA	AGG	CTG	TCA	GCT	TTC	CTC	AGC	AAC	ATG	AAG
CAC	TTC	GGA	GAC	GAC	GGT	TCC	GAC	AGT	CGA	AAG	GAG	TCG	TTG	TAC	TTC
V	K	P	L	L	P	R	L	S	A	F	L	S	N	M	K>
1350		1360		1370		1380		1390							
*		*		*		*		*							
TCT	CGT	TCG	GCT	GGA	AAA	CTC	TGG	GAA	CTG	CAG	CAC	GAG	ATC	GAG	GTG
AGA	GCA	AGC	CGA	CCT	TTT	GAG	ACC	CTT	GAC	GTC	GTG	CTC	TAG	CTC	CAC
S	R	S	A	G	K	L	W	E	L	Q	H	E	I	E	V>
1400		1410		1420		1430		1440							
*		*		*		*		*							
TAC	CGC	AAA	ACC	GTG	ATT	GCC	CAG	TGG	AGG	GCG	CTG	GAC	CTG	GAT	GTG
ATG	GCG	TTT	TGG	CAC	TAA	CGG	GTC	ACC	TCC	CGC	GAC	CTG	GAC	CTA	CAC
Y	R	K	T	V	I	A	Q	W	R	A	L	D	L	D	V>
1450		1460		1470		1480		1490							
*		*		*		*		*							
GTG	CTG	ACC	CCC	ATG	CTG	GCC	CCT	GCT	CTG	GAC	TTG	AAT	GCC	CCA	GGC
CAC	GAC	TGG	GGG	TAC	GAC	CGG	GGA	CGA	GAC	CTG	AAC	TTA	CGG	GGT	CCG

FIG. 14-3

V L T P M L A P A L D L N A P G>

1500 1510 1520 1530

AGG GCC ACA GGG GCC GTC AGC TAC ACT ATG CTG TAC AAC TGC CTG GAC
TCC CGG TGT CCC CGG CAG TCG ATG TGA TAC GAC ATG TTG ACG GAC CTG
R A T G A V S Y T M L Y N C L D>

1540 1550 1560 1570 1580

TTC CCT GCA GGG GTG GTG CCT GTC ACC ACG GTG ACT GCT GAG GAC GAG
AAG GGA CGT CCC CAC CAC GGA CAG TGG TGC CAC TGA CGA CTC CTG CTC
F P A G V V P V T T V T A E D E>

1590 1600 1610 1620 1630

GCC CAG ATG GAA CAT TAC AGG GGC TAC TTT GGG GAT ATC TGG GAC AAG
CGG GTC TAC CTT GTA ATG TCC CCG ATG AAA CCC CTA TAG ACC CTG TTC
A Q M E H Y R G Y F G D I W D K>

1640 1650 1660 1670 1680

ATG CTG CAG AAG GGC ATG AAG AAG AGT GTG GGG CTG CCG GTG GCC GTG
TAC GAC GTC TTC CCG TAC TTC TTC TCA CAC CCC GAC GGC CAC CGG CAC
M L Q K G M K K S V G L P V A V>

1690 1700 1710 1720 1730

CAG TGT GTG GCT CTG CCC TGG CAA GAA GAG TTG TGT CTG CGG TTC ATG
GTC ACA CAC CGA GAC GGG ACC GTT CTT CTC AAC ACA GAC GCC AAG TAC
Q C V A L P W Q E E L C L R F M>

1740 1750 1760 1770

CGG GAG GTG GAG CGA CTG ATG ACC CCT GAA AAG CAG TCA TCC TGA TGG
GCC CTC CAC CTC GCT GAC TAC TGG GGA CTT TTC GTC AGT AGG ACT ACC
R E V E R L M T P E K Q S S *

1780 1790 1800 1810 1820

CTC TGG CTC CAG AGG ACC TGA GAC TCA CAC TCT CTG CAG CCC AGC CTA
GAG ACC GAG GTC TCC TGG ACT CTG AGT GTG AGA GAC GTC GGG TCG GAT

1830 1840 1850 1860 1870

GTC AGG GCA CAG CTG CCC TGC TGC CAC AGC AAG GAA ATG TCC TGC ATG
CAG TCC CGT GTC GAC GGG ACG ACG GTG TCG TTC CTT TAC AGG ACG TAC

1880 1890 1900 1910 1920

GGG CAG AGG CTT CCG TGT CCT CTC CCC CAA CCC CCT GCA AGA AGC GCC
CCC GTC TCC GAA GGC ACA GGA GAG GGG GTT GGG GGA CGT TCT TCG CGG

1930 1940 1950 1960 1970

GAC TCC CTG AGT CTG GAC CTC CAT CCC TGC TCT GGT CCC CTC TCT TCG
CTG AGG GAC TCA GAC CTG GAG GTA GGG ACG AGA CCA GGG GAG AGA AGC

FIG. 14-4

1980				1990				2000				2010			
★				★				★				★			
TCC	TGA	TCC	CTC	CAC	CCC	CAT	GTG	GCA	GCC	CAT	GGG	TAT	GAC	ATA	GGC
AGG	ACT	AGG	GAG	GTG	GGG	GTA	CAC	CGT	CGG	GTA	CCC	ATA	CTG	TAT	CCG
2020				2030				2040							
★				★				★							
CAA	GGC	CCA	ACT	AAC	AGC	CCC	GGA	ATT							
GTT	CCG	GGT	TGA	TTG	TCG	GGG	CCT	TAA							

FIG. 14-5

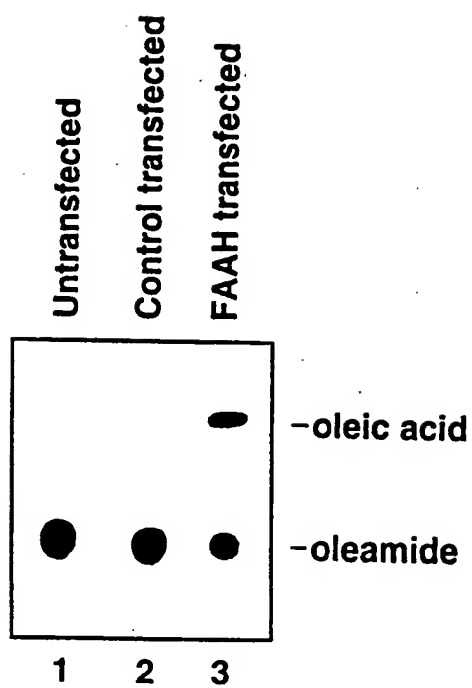


FIG. 15A

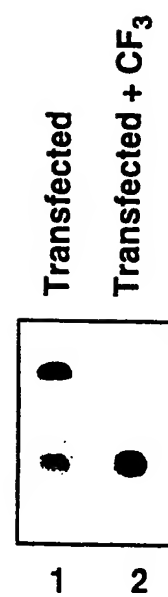


FIG. 15B

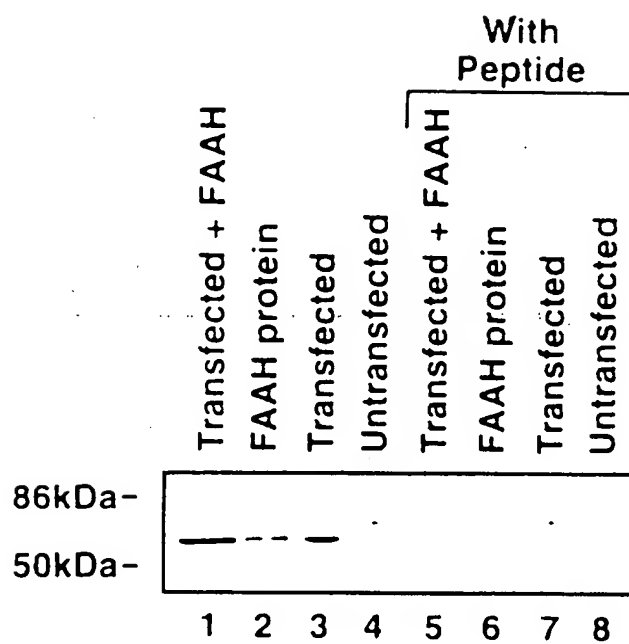


FIG. 15C

● — oleic acid

● ● — oleamide

1 2

FIG. 16

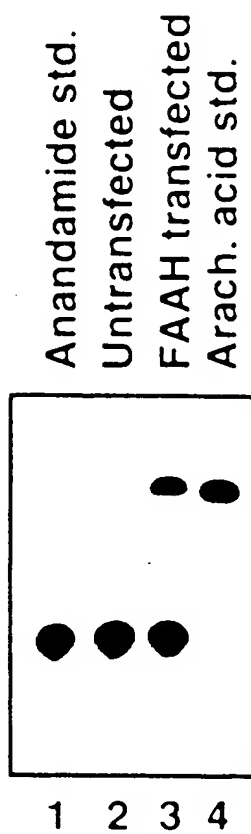


FIG. 17